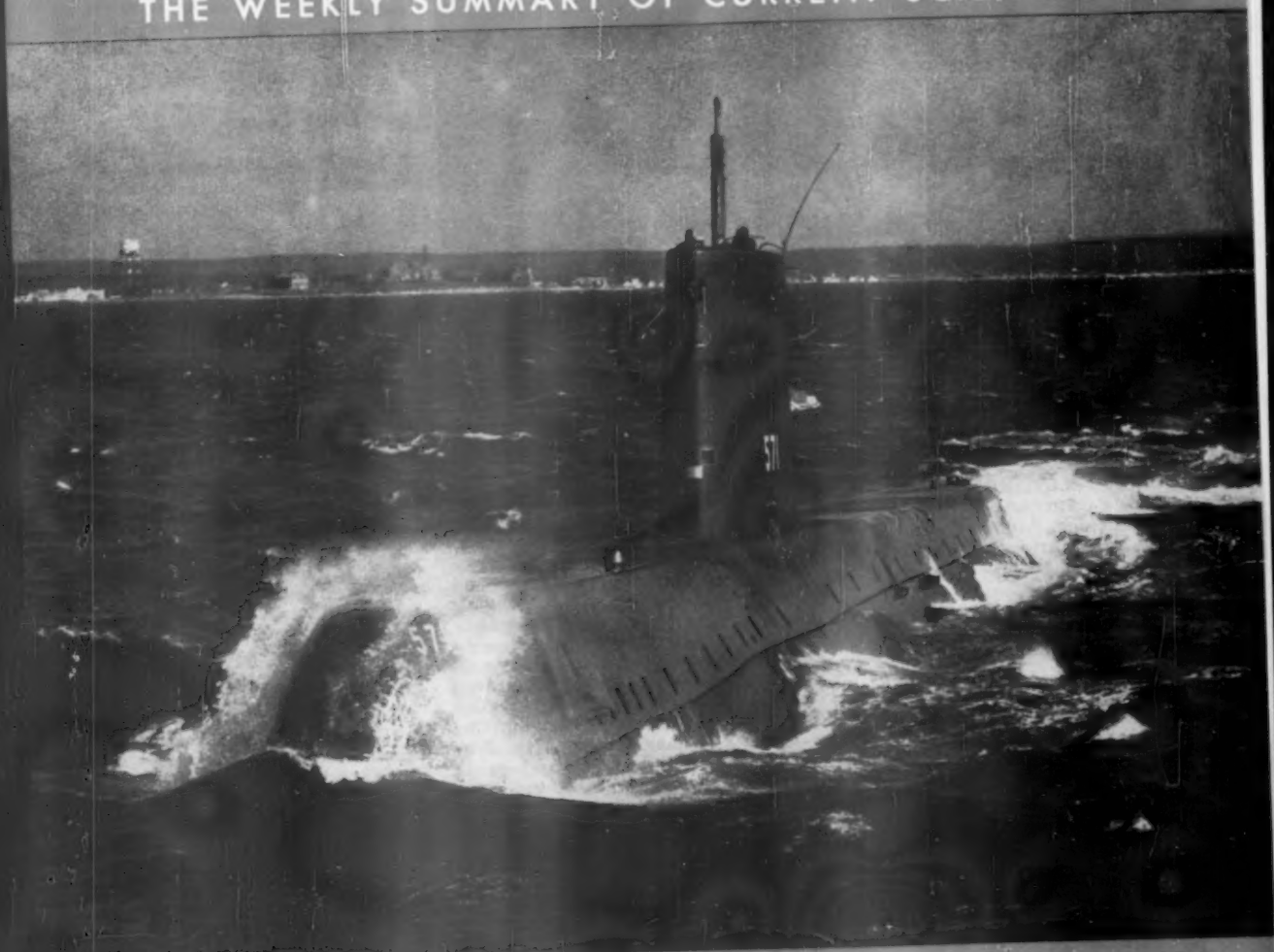
15¢
$5.50 A YEAR

January 29, 1955

VOL. 67, NO. 5 PAGES 65-80

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Atomic Sub at Sea

See Page 66

A SCIENCE SERVICE PUBLICATION

TV BLOWUP — Cancer cells are shown magnified electronically 15,000 times on a six-foot screen. The image, used in a demonstration of TV consultation by doctors, was projected in color. A television camera picked up the picture from a microscope.

MEDICINE

Doctors Consult By TV

➤ COLOR TELEVISION has reached the point where doctors around the country can confer successfully with its aid, exchanging opinions on a particular specimen one of them has under his microscope or on his demonstrating table.

It still has a little way to go before some doctors would be willing to give a definitive diagnosis on the basis of what they could see on their color TV screen.

This sums up opinions expressed by scientists who gathered at the Armed Forces Institute of Pathology in Washington to see the first inter-city consultation and diagnosis.

For the most part, the scientists were enthusiastic as they watched Dr. I. S. Ravdin and his son, Dr. Robert, in the operating room of the University of Pennsylvania Hospital, Philadelphia, remove a bit of tissue which Dr. Robert Horn, pathologist, froze, sliced and fixed on a slide under his microscope.

Color TV cameras picked up the microscopic view for transmission to the group in Washington and to pathologists in Baltimore. Dr. Hugh Grady, director of the American Registry of Pathology, sitting before the TV screen in a studio at station WBAL, Baltimore, was heard to say he could see the "nucleoli" clearly. The nucleoli are very small round bodies inside the nuclei of cells.

Their clear visibility was evidence of color TV's ability to pick up and transmit fine and often vitally important detail. There was agreement among the scientists in the three cities on a diagnosis of cancer.

Less agreement and good-natured "kidding" took place when pathologists at the Naval Medical Center at nearby Bethesda, Md., put slides under their microscope for color TV transmission to the group at the A.F.I.P. building at Walter Reed Army Medical Center. The Navy group deliberately picked some tough ones. When asked for a diagnosis from one of the slides, two pathologists at the conference answered they would like to see the slide under their own microscopes. The Navy doctor answered, "You are seeing it through a microscope."

Disagreement on one slide was definite and would have been serious had it been up for long-distance diagnosis on which to base treatment. In that case, one scientist at the conference called the specimen "benign," meaning harmless, whereas another stated definitely that it was "malignant," or cancerous.

Practice and experience with this new medium apparently will be needed by the doctors. One pointed out that green was a poor background color for most pathologic specimens which would be red themselves. Another said teamwork would be needed between doctors in different cities in learning each other's way of handling specimens so that slight individual differences would not interfere with interpreting what was being seen on the TV screen.

While the consultant could see the specimen on a broadcasting studio's screen or on his own home or office color TV set, hospitals wanting the benefit of color TV consultation and, perhaps, diagnosis will have to install cameras and equipment for transmission over closed circuits.

The Philadelphia-Baltimore-Washington hook-up was an RCA presentation while CBS presented the Bethesda to Washington part of the program.

Science News Letter, January 29, 1955

ENGINEERING

Nautilus Goes to Sea To Test Equipment

See Front Cover

➤ THE WORLD'S first atomic powered ship, the U.S.S. Nautilus, cut through the waves of Long Island Sound in its first series of trial sea runs, as shown on the front cover of this week's SCIENCE NEWS LETTER.

Weighing 2,800 tons, the blunt-nosed submarine has a nuclear steam generating plant that could propel it around the world without refueling.

The purpose of the runs were to check the engines, steering equipment and electronic devices under sea conditions. The apparatus had previously undergone wet-dock tests.

The sub is also equipped with a conventional engine that would take over if the atomic engine failed. The $40,000,000 vessel was made ready last fall but sea trials were delayed because the wrong kind of piping had been installed.

Science News Letter, January 29, 1955

ENGINEERING

Electronic Computer Aids Better Lighting Designs

➤ TO AID architects in designing better-lighted schools, offices and homes, an analogue computer that can electronically simulate design factors influencing illumination has been developed by Philip F. O'Brien of the engineering department of the University of California at Los Angeles.

Colors of ceilings, walls and floors and types of artificial illumination can be changed in the device by a twist of knobs. Other factors influencing illumination such as windows, louvres and overhanging architecture may be represented in the machine.

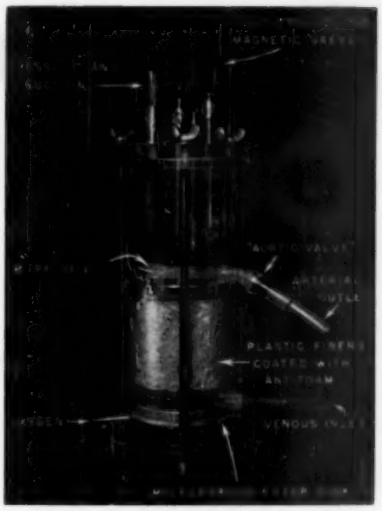
The device may also aid in color selection for walls and ceiling. It is difficult to predict the exact hue a wall will assume as a result of reflections from the floor. For example, white walls and a red floor may make the walls appear a slight pink color. Such variations can be predicted accurately with the aid of the new luminous analyzer.

Science News Letter, January 29, 1955

MEDICINE

Heart-Lung Substitute

A device not much larger than a water glass oxygenates and pumps blood at same time. It is expected to find use in chest surgery and in combat hospitals.



PUMPS AND BREATHES — This device, three and one-half inches in diameter and ten inches tall, performs the functions of the heart and the lungs at once. With it doctors could operate while a dog's natural heart was stopped for an hour.

➤ A COMBINED mechanical heart and lung, not much bigger than a large-sized water glass, has been developed and used successfully in experiments with dogs.

Using millions of microscopic holes as the key to its operation, the artificial heart and lung should make it possible for virtually every hospital and research center, regardless of size, to have this mechanical substitute at its disposal for use during major chest surgery. It should also be valuable to the military for use in the combat zones.

Measuring three and one-half inches in diameter and ten inches in height, the mechanical apparatus diffuses oxygen into the blood and removes the free oxygen from the blood system before putting it back into the body.

The device is the result of several years experimentation and development by Dr. Frank Gollan of the Thayer Veterans Administration Hospital, Nashville, Tenn., with the cooperation of the Selas Corporation of America, Philadelphia, Pa. The artificial heart and lung is expected to make obsolete the bulky and complicated mechanical hearts and lungs now being used.

The apparatus works, George V. Jordan Jr. of Selas explained, when oxygen, which is pumped into the cylinder at a pressure of approximately 20 pounds per square inch, diffuses through a microporous filter disk made of porcelain and having 800,000,000 holes to the square inch.

At the same time, blood from the veins is pumped above the filter and mixes with the diffused oxygen. It then passes through plastic fibers coated with a substance to prevent foaming, which removes the free oxygen by filtration. The blood is pumped back into the arteries.

In experiments conducted at the Thayer Veterans Administration Hospital, the use of the mechanical heart and lung has made it possible to maintain a cardiac arrest of one-hour duration in dogs during a period of cold temperature reaching as low as 50 degrees Fahrenheit.

The animals were revived without any clinically detectable damage.

In other experiments using the artificial heart and lung with dogs at the hospital, scientists were able to perform surgery on the left heart without the danger of air embolism. The entire venous return to the right heart was shunted into the combined heart-lung, refrigerated and returned under pressure to the aorta. At 55.4 degrees Fahrenheit, the researchers reported, the heart stopped beating and the left ventricle was opened.

The heart chambers were empty and, due to cardiac arrest, coronary air embolism did not occur. After about 30 minutes of cardiac arrest, the heart was closed, the blood rewarmed and normal functions returned to the animal without evidence of cerebral or cardiac damage. The lowest body temperature reached was about 34 degrees Fahrenheit.

This experiment was conducted by Drs. Gollan, Merrill W. Schell, James T. Grace and Donald S. Tysinger.

In still another experiment using the pump-oxygenator as a substitution for the heart and lungs, dogs were kept alive at temperatures below 50 degrees Fahrenheit without hemoglobin, which pointed up the life-saving usefulness of the artificial heart and lung to prevent circulatory failure during operations performed when the subject has undergone "freezing."

Science News Letter, January 29, 1955

GENERAL SCIENCE

Military Reserve Plan

➤ PRESIDENT EISENHOWER'S new military reserve plan, sent to Congress, could go a long way toward solving the nation's problem of how best to utilize its specialists during emergencies.

In the new plan, a government manpower expert stated, the Administration has provided the necessary machinery for using the country's scientists, technicians and engineers to their best capacity. But, he cautioned, it will work only if properly administered.

Previous manpower plans and selective service acts did not provide for best use of the specialists to meet the nation's needs, and both the military and civilian economies suffered heavily as a result.

If the plan is accepted by Congress, the establishment of a board made up of members who are familiar with the specialist needs of the nation to guide the flow of trained personnel into both military and civilian jobs will be needed, the expert reported.

The problem of utilizing scientists, technicians and engineers during emergencies has grown more acute with the increase in the technological and personnel training race between this country and Russia.

Under the new plan, the expert explained, it is projected that specialists in school can be deferred until they finish their education, and then be allowed to enlist for six months of active duty, to be followed by nine and one-half years of obligatory duty in the reserve corps.

The administration's plan, as it is now set up, permits only those men under 19 years of age to enlist for six months and then these youths must join the National Guard or a first line Army or Marine Reserve unit. The age limitation could be waived for specialists.

Normally, a six-month enlistee would be in the "Service Callable Reserve," which is subject to immediate recall. It is hoped that specialists who serve for six months will be permitted to make up their reserve obligation in the "Selectively Callable Reserve," a standby pool that can be called to active duty only in a national mobilization.

This would insure proper utilization in time of need, for otherwise, the expert pointed out, the nation's scientific and technical manpower pool would face the risk of being recalled en masse immediately, in any sudden emergency, leaving our technology helpless.

Another Korea, for example, would mean that the nation's industry and educational system might face a dangerous denuding of their young specialists. This would not only set back production and research necessary during emergency, but impair the nation's future technological, educational and scientific health, he said.

Science News Letter, January 29, 1955

MEDICINE

To Inject Tobacco Tars

➤ A TECHNIQUE originally worked out to give calories to wounded soldiers too sick to eat will now be applied to solving the question of whether tobacco causes lung cancer.

This was learned from Dr. Frederick J. Stare, professor of nutrition at the Harvard School of Public Health, Boston, after the Tobacco Industry Research Committee announced Dr. Stare would receive one of nine grants it is currently awarding.

Getting fats into emulsions that can be safely injected into the veins is the technique Dr. Stare will adapt to the lung cancer-tobacco problem. He and his associates worked out the emulsion technique for vein feeding during World War II. Before then it had not been possible to feed fats by vein.

Now Dr. Stare and associates will try to incorporate material from tobacco tars into emulsions. If they succeed in this, they will inject the emulsion into the veins of laboratory rats and see whether the material is carried by the blood to the lungs, and whether it lodges there and causes irritation and, perhaps, cancer. If it does, this will be pretty good evidence for material in tobacco tars causing lung cancer. And in that case, the technique will give a good testing system for tobaccos treated to get rid of the cancer-causing material.

If the animals do not get lung cancer, the evidence will be pretty good that the material in tobacco tar does not cause this condition.

Dr. Stare and his group think they can be sure of getting the material into the lungs by making the particles in the emulsion the right size for tending to lodge in the tiny blood vessels, called capillaries, in the lungs.

Which answer will come from the studies is not yet known, Dr. Stare emphasized.

All known cancer-causing chemicals are soluble in fat. Knowing that, Dr. Stare and associates previously used their emulsion technique to inject into the veins of female rats one known cancer-causer, dimethylbenzanthracene. It produced cancer of the breast in 100% of the animals.

Heretofore, this chemical had only been tested by painting it on the skin of laboratory animals. The skin painting method has also been used for testing possible cancer-causing activity of tobacco tars.

The results have been considered by some scientists to show only that tobacco tars might cause skin cancer in laboratory animals but to prove nothing about lung cancer. The vein injection of tobacco tar material should, Dr. Stare feels, give a more positive answer since it will get the chemicals into the lungs.

Science News Letter, January 29, 1955

GENERAL SCIENCE

More Funds for Science

➤ PRESIDENT EISENHOWER has recommended to Congress that the Federal Government spend more money than ever before on research and development during the fiscal year 1956.

In his annual budget message, he proposed spending $2,218,000,000 on scientific programs from July 1, 1955, to June 30, 1956, the government's budget year. This is an increase of $147,000,000 over the amount estimated to be spent for this purpose during the current fiscal year.

Funds asked by the President for scientific research and development are about half the total spent on such programs in the United States. The National Science Foundation is charged with coordinating Federal support for basic research. To do this job, President Eisenhower recommended that the Foundation get $20,000,000 in fiscal 1956, an increase of about $7,400,000 over its current budget.

Another $11,000,000 was asked for the Foundation to support United States participation in the International Geophysical Year, scheduled for 1957-58, a world-wide program to learn more about the earth, its seas and air.

Scientific data accumulated during this period are expected to contribute to advancements in "weather forecasting and control, radio communications, navigation and upper atmosphere flight," according to the budget.

The increase in the total requested to run Federal research and development programs is seen in higher totals for practically every government bureau or agency concerned.

As recommended by a committee of top flight scientists, more money has been requested to run the National Bureau of Standards so that it will "serve more adequately to meet the scientific needs" of this country. President Eisenhower asked Congress for $7,750,000 to do this, an increase of $1,760,000 over its present budget.

Also in line with recommendations of another review committee, the President requested $27,850,000 to run the Weather Bureau during the fiscal year 1956. This is $3,100,000 more than was appropriated in 1955. Another $5,000,000 was asked for the Weather Bureau for setting up new weather observing stations as well as for modernizing existing facilities.

Science News Letter, January 29, 1955

The *electricity* to make a ton of aluminum would supply the electrical needs of a six-room house for 15 years.

ENGINEERING

Uranium-Paved Road Once Thought Worthless

➤ A ROAD on the outskirts of Carcoar, in western New South Wales, Australia, is paved with uranium.

So are the bush tracks leading to the town's long disused iron ore shafts.

Tests conducted by the New South Wales Government's Department of Mines revealed that the iron-ore shafts are rich with uranium, and that the horseshoe of hills ringing the town also contain large deposits.

Science News Letter, January 29, 1955

SCIENCE NEWS LETTER

VOL. 67 JANUARY 29, 1955 NO. 5

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., NOrth 7-2255. Edited by WATSON DAVIS.

Subscription rates: 1 yr., $5.50; 2 yrs., $10.00; 3 yrs., $14.50; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

Copyright, 1955, by Science Service, Inc. Republication of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service. Science Service also publishes CHEMISTRY (monthly) and THINGS of Science (monthly).

Printed in U. S. A. Entered as second class matter at the post office at Washington, D. C., under the act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for by Sec. 34.40, P. L. and R., 1948 Edition, paragraph (d) (act of February 28, 1925; 39 U. S. Code 283), authorized February 28, 1950. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 1 E. 54th St., New York 22, ELdorado 5-5666, and 435 N. Michigan Ave., Chicago 11, SUperior 7-6048.

SCIENCE SERVICE

The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees — Nominated by the American Association for the Advancement of Science: Kori Lark-Horovitz, Purdue University; Kirtley F. Mather, Harvard University; Paul B. Sears, Yale University. Nominated by the National Academy of Sciences: Homer W. Smith, New York University; Edward U. Condon, Berkeley, Calif.; Harlow Shapley, Harvard College Observatory. Nominated by the National Research Council: Duane Roller, Los Angeles, Calif.; Ross G. Harrison, Yale University; Leonard Carmichael, Smithsonian Institution. Nominated by the Journalistic Profession: Neil H. Swanson, Baltimore, Md.; O. W. Riegel, Washington and Lee University; Michael A. Gorman, Flint Journal. Nominated by the Scripps Estate: Charles E. Scripps, Cincinnati, Ohio; Edward J. Meeman, Memphis Press-Scimitar; John T. O'Rourke, Washington Daily News.

Officers — President: Leonard Carmichael; Vice President and Chairman of Executive Committee: Charles E. Scripps; Treasurer: O. W. Riegel; Secretary: Watson Davis.

Staff — Director: Watson Davis. Writers: Jane Stafford, Marjorie Van de Water, Ann Ewing, Howard Simons, Edward Hausman. Science Clubs of America: Joseph H. Kraus, Margaret E. Patterson. Photography: Fremont Davis. Sales and Advertising: Hallie Jenkins. Production: Priscilla Howe. Interlingua Division in New York: Alexander Gode, Hugh E. Blair, 80 E. 11th St., GRamercy 3-5410.

GENERAL SCIENCE

Scientists of the Future

Eight girls and 32 boys are selected as winners in annual national Science Talent Search. They will meet in Washington to compete for $11,000 in scholarships.

➤ THE 40 most promising young scientists in America's high schools have just been selected in the Fourteenth Annual Science Talent Search. The winners—eight girls and 32 boys—have been invited to Washington for a five-day all-expenses-paid visit Feb. 24 through Feb. 28.

They will participate in the Science Talent Institute and compete for $11,000 in Westinghouse Science Scholarships in the finals of the Science Talent Search conducted by Science Clubs of America, administered by SCIENCE SERVICE.

Nation-Wide Competition

The 40 trip-winners, 15 to 18 years of age, were chosen by a panel of judges after a nation-wide competition in which top-ranking seniors in all the public, parochial and private schools in continental United States were invited to participate. (See p. 74.)

Entrants, representing every state in the Union and the District of Columbia, totaled 16,033, of whom 2,575 completed the stiff science aptitude examination, submitted recommendations and scholarship records, and wrote a report on "My Scientific Project."

At the end of the winners' five-day stay, Feb. 24 through Feb. 28, the judges will award the scholarships. One boy or girl will receive the $2,800 Westinghouse Grand Science Scholarship ($700 per year for four years). The runner-up will receive a $2,000 Westinghouse Science Scholarship.

Westinghouse Science Scholarships, ranging in size from $100 to $400 and bringing the total to $11,000, will be awarded at the discretion of the judges to the rest of the winners.

The scholarships may be used at any college, university or technical school of the winners' choice so that they may continue their training in science or engineering.

Many Areas Represented

Chosen without regard to geographic distribution, the 40 trip-winners come from 32 cities in 17 states. One of the states represented, North Carolina, never has had a winner in a previous Search. States represented by winners since 1942 now total 43.

Four high schools in the United States have produced more than one winner this year. Evanston (Ill.) Township High School will send two boys. Erasmus Hall High School of Brooklyn and Forest Hills (N. Y.) High School will send one boy and one girl each. Two boys will come from the Fairfield (Conn.) College Preparatory School.

Nineteen of the winners this year come from schools that have never before placed a winner in the annual Science Talent Search. The other 21 added new laurels to schools already honored in the past by having produced winners. Each school having a winner receives a bronze and walnut plaque to add to the school's trophy collection.

The honor of being all-time top-producer of winners goes to Forest Hills (N. Y.) High School. Their 14-year total is 19 winners. Close behind is Stuyvesant High School in New York City with 18 winners —a total that only one other school in the USA can match.

Evanston (Ill.) Township High School, the only school in the country to produce two previous winners of Westinghouse Grand Science Scholarships, adds two winners this year to bring to 10 its total for the 14-year period.

Three Brooklyn (N. Y.) schools have upped their total of winners: Midwood High School to nine; Erasmus Hall High School to eight; and James Madison High School to two.

New Rochelle (N. Y.) High School has brought its total of winners to six for the 14 years; while Bassick High School in Bridgeport, Conn., can now boast of four for the same period.

Schools With 3 Winners

The following schools have been able to place three winners each since 1942 when the Search began: Webb School of California in Claremont; Fairfield (Conn.) College Preparatory School; University High School in Urbana, Ill.; Princeton (N. J.) High School; and South Charleston (W. Va.) High School.

This year's winners also up these schools into the group having placed two winners in the 14 years of the Search: East High School, Denver, Colo.; Newton High School, Newtonville, Mass.; Trenton (N. J.) Central High School; and Allentown (Pa.) High School.

All but one of the winners live at home and attend their local or nearby public, parochial or private secondary schools.

Of the Science Talent Search trip-winners 45% rank first, second or third in their graduating classes, which range in size from 22 to 1,207 students. Exactly 80% of the winners' fathers and 60% of their mothers attended college. A number have parents who were born or educated abroad. Of the winners 31 claim no scientists among their relatives; the others have one or more scientists among their close or distant relatives.

Contrary to a frequent conception about scientists, the winners are not interested in science only. While most of them spend much of their spare time in science pursuits such as science clubs and individual hobbies of a scientific nature, all of them have participated in varied extracurricular interests such as music, athletics, journalism and dramatics, and all belong to social and educational organizations outside their school work.

Many of the top 40 already have chosen the lines of study they wish to pursue. Physics attracts ten, engineering nine. Seven wish to be chemists and six biologists. Five plan careers in medicine, while one each has hopes to be a geologist and guidance counsellor. Only one remains undecided. All expect to do research in their respective fields.

Previous Winners Succeed

Records show that 93% of those chosen in the first six years (1942-1947) of the Science Talent Search are now science trained. Of these 240 a total of 95% have their bachelor's degree; 70% have a master's degree and 48% have a M.D., Ph.D., or D.Sc. degree.

Physical sciences lead in their choice of careers with physics and mathematics outdistancing chemistry. Engineering has attracted another large group. Of those who have chosen biological careers, the largest number is in medicine.

The largest number of the 240 have taken positions in industry, working mostly on research problems. Government and academic positions are also of the research type.

In addition to the 40 trip-winners, who will attend the Science Talent Institute in Washington, an Honorable Mentions list of 260 in the Fourteenth Annual Science Talent Search will be announced Feb. 3. These high ranking contestants will be recommended to colleges and universities for their aptitude in science. If they are as fortunate as those previously included in the Honorable Mentions List, they will receive offers of scholarships from many institutions of higher education seeking students with talent in science.

State Science Talent Searches

Through an arrangement with Science Clubs of America 26 states and the District of Columbia are conducting state Science Talent Searches concurrently with the national competition. Ten of them have produced winners this year. In these 27 areas all entries in the national Science Talent Search will be turned over to state judging committees.

From their entries they will choose state winners and award scholarships to various colleges and universities within the state. Cooperating states are: Alabama, Arkansas, District of Columbia, Georgia, Illinois, Indiana, Iowa, Kansas, Maine, Massachusetts, Michigan, Minnesota, Montana, New Hampshire, New Mexico, North Carolina, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas,

Vermont, Virginia, West Virginia and Wisconsin.

The Annual Science Talent Search is conducted by Science Clubs of America, administered by SCIENCE SERVICE. Scholarships are provided and the Science Talent Search made financially possible by the Westinghouse Educational Foundation, an organization endowed by the Westinghouse Electric Corporation, for the purpose of promoting education and science.

Science Clubs of America, administered by SCIENCE SERVICE, is the international organization for science groups, in schools and out. Today more than 15,000 clubs are affiliated here and abroad, with a membership of more than one-third of a million young people. All are encouraged to participate in the Search and the National Science Fair.

Complete details of the National and the 27 State Science Talent Searches are available from Science Clubs of America, 1719 N St., N.W., Washington 6, D. C.

Science News Letter, January 29, 1955

NUTRITION

Instant Citrus Juice Made From Crystals

➤ HOUSEWIVES SOMETIME this year will be able to buy "instant" orange and grapefruit juice as well as the canned, frozen concentrate and fresh fruit for home squeezing.

The "instant" juice, cans of crystals that dissolve quickly in cold water, was developed by its manufacturers, Orange Crystals, Inc., of Plant City, Fla.

In color, flavor and aroma, the "instant" juice would be hard to tell from freshly squeezed citrus juice. And tests by the U. S. Department of Agriculture and the Quartermaster Corps showed that the "instant" juice could be stored for six months at 100 degrees Fahrenheit without losing flavor or vitamin value.

Secret of the process seems to lie in a vacuum-drying controlled heat process plus two chemicals. One chemical is a sugary substance called sorbitol which is used to "entrap" the essential oils and esters that carry the citrus fruit flavor and fragrance. The other is a drying chemical in a small envelope inside each can of crystals.

In-package dessication, or drying, using lime for the moisture-absorbing substance was announced in 1945 by Dr. L. B. Howard, formerly with the Department of Agriculture, now at the University of Illinois.

Department of Agriculture scientists as well as scientists in private industry and at the Massachusetts Institute of Technology, Cambridge, Mass., worked during World War II to try to develop citrus fruit crystals or powder that would keep under all climatic conditions, and be saving of shipping space and weight. Although the "instant" citrus juices also save weight and space and have good keeping quality without refrigeration, they are a far cry from the lemon powder used in World War II.

Science News Letter, January 29, 1955

GENERAL SCIENCE

STS Winners Selected

* Indicates girls H. S. indicates High School

		CALIFORNIA
Claremont	Fleishhacker, David	17 Webb School of California
Del Paso Heights	Havey, James Halbert Jr.	17 Grant Union H. S.
San Francisco	Briggs, Thomas Stafford	16 Abraham Lincoln H. S.
		COLORADO
Denver	Aandahl, Vaughan Allan	17 East H. S.
		CONNECTICUT
Bridgeport	*Hartley, Alice Katherine	17 Bassick H. S.
Fairfield	Buccino, Robert Anthony	17 Fairfield College Preparatory
	Foster, Edward John	16 Fairfield College Preparatory
		ILLINOIS
Evanston	Reed, Jack Donald	16 Evanston Township H. S.
	Sommerfield, Martin David	17 Evanston Township H. S.
Greenville	*Tate, Patricia Ann	17 Greenville H. S.
Rockford	Potter, James Emerson	17 West Rockford Senior H. S.
Urbana	Webb, Stephen Richard	16 University H. S.
		INDIANA
South Bend	Fassnacht, Robert Earl	18 Central Junior-Senior H. S.
		KANSAS
Kansas City	Wilson, Daniel Hughes	17 Sumner H. S.
		MASSACHUSETTS
Newtonville	Kalnajs, Agris Janis	17 Newton H. S.
		MISSISSIPPI
Jackson	Penney, David Emory	17 Central H. S.
University	MacDonald, John Lauchlin	16 University H. S.
		NEBRASKA
Omaha	*Tollman, Janet	17 Benson H. S.
		NEW JERSEY
Audubon	Eichman, Charles Jetter	17 Audubon H. S.
Princeton	Nergaard, David Karl	18 Princeton H. S.
Trenton	Webster, Norman Adelbert III	17 Trenton Central H. S.
		NEW YORK
Brooklyn	*Harman, Mary Ella	16 Erasmus Hall H. S.
	Levine, Stephen Samuel	17 Erasmus Hall H. S.
	Bachrach, David	16 James Madison H. S.
	Rosen, Michael Ira	16 Midwood H. S.
Canastota	*Myers, Carol Elnora	16 Canastota Central H. S.
Forest Hills	*Fishman, Roberta Jane	16 Forest Hills H. S.
	Fried, Michael Martin	15 Forest Hills H. S.
New Rochelle	Kripke, Bernard Robert	15 New Rochelle H. S.
New York	Barth, Rolf Frederick	17 La Salle Academy
	Hoffman, Roald	17 Stuyvesant H. S.
		NORTH CAROLINA
Wilmington	Vaughan, Maurice Hamilton Jr.	17 New Hanover H. S.
		OHIO
Fremont	Shilling, A. Gary	17 W. W. Ross H. S.
Youngstown	Williams, Lawrence Ernest	17 East H. S.
		PENNSYLVANIA
Allentown	Greenleaf, Frederick Paul	17 Allentown H. S.
		TENNESSEE
Nashville	Marshall, Winston Stanley	18 Isaac Litton H. S.
		WEST VIRGINIA
Charleston	Stone, John William	17 Stonewall Jackson H. S.
South Charleston	*Hawkins, Carol Irene	17 South Charleston H. S.
		WISCONSIN
Appleton	Harriman, John Edward	18 Appleton Senior H. S.
Marshfield	*Hable, Kathleen Anne	18 Columbus H. S.

PHYSICS

High Altitude Stations Number at Least 42

➤ THERE ARE at least 42 high altitude research laboratories and observatories around the world, Dr. Serge A. Korff, cosmic ray physicist at New York University, reported.

Uncertain is the number of such stations behind the Iron Curtain. The Russians probably "operate one high altitude laboratory in the Caucasus," but what others, if any, are not known, Dr. Korff pointed out in describing the world's lofty research facilities.

High altitude is defined in the report, financed by the National Science Foundation and UNESCO, as about 7,500 feet or above. Meteorology, cosmic rays, radio astronomy and sun-earth relationships are a few of the fields that benefit greatly from research at high altitudes.

Highest station covered in the report is the 18,000-foot Chacaltaya Cosmic Ray Laboratory in Bolivia.

The northernmost, and also the newest, high altitude station is Mt. Wrangell Observatory on a 14,006-foot Alaskan peak, which is run jointly by New York University and the University of Alaska. It was established in 1953.

Southernmost observatory is Argentina's Cosmic Ray Station in the Argentine sector of the Antarctic.

The United States has seven high-altitude research observatories, more than any other nation. The highest of these is the 14,150-foot Mt. Evans, Colorado, laboratory.

Dr. Korff's report includes such data on each station as location, scientific and living facilities, climate and weather, photographic equipment, available electric power and library facilities.

Science News Letter, January 29, 1955

INVENTION

Wrinkles Made to Order Hide Unwanted Wrinkles

➤ THE PROBLEM of what to do about wrinkled clothes has been partially solved by Albert S. Jones of Webster, Mass., who received a government patent for his invention which puts permanent wrinkles in textile fabrics.

Mr. Jones' method, which produces undirectional wrinkles in an extended sheet of textile, is simply done by pressing in many directions a sheet of fabric moistened with a fixing agent. The material is then passed through high pressure mangle rolls and dried to set the wrinkles.

The inventor claimed that the permanent wrinkles tend to conceal other wrinkles and that, for this reason, it is not necessary to iron the fabric after washing.

The wrinkle-making method, which received patent No. 2,695,653, was assigned to the Cranston Print Works Company of Cranston, R. I.

Science News Letter, January 29, 1955

MOUNTAIN-TOP RESEARCH—The Pic du Midi high altitude laboratory in the French Pyrenees is one of the 42 stations of its kind in the free world. The site, used for studies in astronomy, cosmic rays, geophysics, botany and meteorology, is at an altitude of 9,370 feet.

RADIO ASTRONOMY

Absorption Lines Found

➤ RADIO WAVES being broadcast by heavenly sources show absorption lines just as light from the stars does. Astronomers around the world are excitedly discussing this discovery, which opens up a new era in astronomical research.

Discovery of these absorption lines in radio waves from otherwise invisible points in the sky gives astronomers another yardstick for measuring distances within the Milky Way galaxy in which the sun is but one of hundreds of millions of stars.

It also tells them about the amount and distribution of the hydrogen gas filling the space between the stars.

Drs. John P. Hagen and Edward F. McClain of the Naval Research Laboratory in Washington were the first to spot the absorption lines in radio waves of 21 centimeters, or about eight inches. Dr. A. Edward Lilley and Miss Nannielou Hepburn, also of the Naval Research Laboratory, have now joined them in an intensive search for other sources showing the same absorption lines.

From their studies so far, Dr. Hagen and his associates have concluded that interstellar hydrogen is probably distributed in clouds in interstellar space, rather than continuously as has been thought.

These hydrogen clouds have diameters of several parsecs, one parsec being the distance light travels in 3.26 years. Within such clouds, the hydrogen atoms are comparatively dense for interstellar space, 100 per cubic centimeter, according to their calculations, compared to the one per cubic centimeter assumed for uniform distribution of the hydrogen.

The radio wave absorption lines result when such hydrogen clouds come between the relatively bright background of a heavenly radio source that is broadcasting at a wavelength of 21 centimeters. The clouds, which also radiate on their own at 21 centimeters, cut out that particular wavelength when they are between the earth and the bright radio source.

This is absorption and is familiar to optical astronomers who work with light waves. It is caused by atoms and molecules taking up, or absorbing, the energy of a source whose temperature is higher. Just as stars emit light waves, so also do certain heavenly sources send out radio waves.

These radio sources have a "temperature," or energy level as visible stars do. When the temperatures of such sources are considerably higher than the estimated 120 degrees Kelvin of interstellar hydrogen, the resulting absorption can be detected by delicate electronic instruments.

So far, only four radio "stars" showing absorption lines have been discovered, although the Naval Research group searches daily for others.

These sources are in Taurus, Cassiopeia, Cygnus, and Sagittarius.

Within the next few years, studies of radio wave absorption in the 21 centimeter region should lead to a more complete chart of the small-scale structure of the Milky Way galaxy than previously possible.

Science News Letter, January 29, 1955

PHYSIOLOGY

Metal-Enzyme Compound Determines Hair Color

➤ THE REASON that human hair is brown or black or that rabbit hair is white or brown, is that different metals are linked up with enzyme or chemical-transforming substances in the body under control of heredity.

This is the new theory put forth by a group of Japanese geneticists at Osaka University and published in *Science* (Jan. 14).

They started with the knowledge that pigments derived from tryptophan, a chemical in insects, are composed of metallic complex salts.

A certain relationship between coloration and the type of metal is found especially in pigments assumed to be derived from tyrosine: namely, white is associated with nickel, yellow with titanium, red with molybdenum; blackish color involving blue, green and brown is associated with copper, cobalt and iron.

Analyses show that there is much more copper and iron in the black hair of the Negro and Mongolian races than in the medium brown hair of the Caucasian race.

Science News Letter, January 29, 1955

PHYSICS

Polarized Radio Signals Tested in Auroral Zone

➤ POLARIZED RADIO signals are being tested as a method of long-distance communication in the zone of the aurora, or northern lights.

Changes in the earth's electrical "roof," or ionosphere, at times seriously hamper radio transmission around the world. In the far North, however, auroral activity is an added major cause of poor radio wave reception.

Polarization of radio waves may be a solution to one or both of these problems, experts at the Thayer School of Engineering of Dartmouth College, Hanover, N. H., believe. A team headed by Dr. Millett G. Morgan, director of research at the school, has devised special equipment by which the radio engineers can maintain consistent reflections of radio waves from the ionosphere for relatively long periods of time.

Their research is supported by the U. S. Navy. The Dartmouth experts worked out their method by sending radio waves straight up to the ionosphere, then observing the echoes from the various ionospheric layers on a television-like tube.

Now they have started on a series of long-distance transmissions between Hanover and special equipment installed at McGill University Sub-Arctic Research Laboratory at Knob Lake in Labrador and at the University of Saskatchewan in Saskatoon.

The Knob Lake installation is designed to test how effectively the new-type signal may be transmitted through the aurora. Knob Lake is 900 miles north of Hanover, thus much of the region of greatest auroral activity lies between the two points.

Polarized radio waves may also be a solution to the problem caused by "SID's," or sudden ionospheric disturbances, when the sun may hurl out a great tongue of flame from which hydrogen atoms bombard the earth about 20 hours later. Shortwave radio can then be blacked out for periods ranging from a few seconds to several hours.

Dr. Morgan and his associates are also working on equipment for adjusting the polarized radio signals automatically to changes in the ionosphere from moment to moment.

Science News Letter, January 29, 1955

PHYSIOLOGY

Lung Full of Fresh Air Can Save a Diver's Life

➤ A DIVER who must surface from a depth of 100 feet or more during an emergency can save his own life with nothing more than a lung full of fresh air.

Even though the actual time needed to reach the surface may be two minutes or longer, the escapee can expect to see daylight if he starts his ascent with a full supply of air and paces himself along the way. This was reported in the *American Journal of Physics* (Jan.) by Hilbert Schenck Jr., of Pratt & Whitney Aircraft, East Hartford, Conn.

Using basic physical concepts, Mr. Schenck analyzed the requirements for surfacing from great depths when a diving unit fails or the escapee has to abandon a sunken submarine. In his study, he found that the most dangerous point of the ascent is not as the surface is approached but at a specified intermediate depth.

The scientist pointed out that the psychological state of a person surfacing is of great importance as to whether he can pace himself properly and therefore live or die.

If the fact that the danger point is at an intermediate point in the ascent is made known to the diver, stated Mr. Schenck, then "the diver who sees a great extent of water over him and experiences a serious need for fresh air might be encouraged if he knew that the tension will not increase during the entire trip to the surface."

Essentially, he reported, the diver rising to the surface is doing no more than testing his ability to hold his breath, and breath-holding ability is extremely variable among various individuals, being as short as 30 seconds and as long as three minutes.

But, he added, even though the actual time for rising may be two minutes, the physiological effect is equivalent to holding one's breath for only 40 seconds.

Anticipating sudden air failure deep underwater in the open sea, Navy underwater swimmers are trained in emergency ascents from depths as great as 100 feet with no external storage reservoir, the scientist stated.

Science News Letter, January 29, 1955

IN SCIEN

MEDICINE

Cancer Patients Lack "Q" Stuff in Blood

➤ DISCOVERY THAT cancer patients have too little of a blood substance called "Q" was announced by the American Cancer Society.

Possibility of "Q" blood tests to aid cancer detection and even of "Q" in treatment of cancer was hinted, though it will take much more testing before this possibility becomes even probable.

"Q," not otherwise identified in the society's announcement, is reported to act "as a brake on the transport of stored energy from one part of the body to another."

Because cancer patients have a deficiency of "Q," "vital energy is transported at reckless rates and spent lavishly on the building and operation of useless cancer cells."

The "Q" findings were made in cancer-society-supported research by Dr. Allen F. Reid, biophysicist, and his associates at Southwestern Medical School of the University of Texas.

Some of the tests were made by incubating red blood cells in blood extracts which contained "Q." The more "Q" added to the medium, the less the red cells picked up phosphate energy. Normal blood extracts showed much more "Q" activity than did cancer blood extracts.

Pending further extensive test tube and animal studies, it will not be known whether blood determinations of "Q" offer any promise as an aid in the detection of cancer. It has not been possible yet to isolate enough "Q" to learn whether it would have any effect as treatment for cancer.

Science News Letter, January 29, 1955

AERONAUTICS

Rocket Engines Make Noise Like Jets

➤ ROCKET ENGINES, the kind used on missiles, make the same sort of noise as jets, experiments by the National Advisory Committee for Aeronautics showed.

The three solid fuel rocket engines tested produced all kinds of noises but the peak was found to be in the lower audible range. Thus they rumble more than they screech. Measurements were made with sound pressure instruments and a tape recorder. The greatest noise pressure was recorded within a 45-degree angle downstream of the rocket exhaust. This angle is somewhat smaller, about 30 degrees, in a subsonic jet.

The work was reported by Leslie W. Lassiter and Robert H. Heitkotter, NACA scientists at Langley Air Force Base, Va.

Science News Letter, January 29, 1955

CE FIELDS

PSYCHIATRY

New Drug Softens Electroshock Treatment

➤ ELECTROSHOCK TREATMENT of the mentally ill can be "softened" and patients thereby protected from broken bones by a new drug, succinyl-choline chloride, Dr. T. R. Robie of East Orange, N. J., reported in the *American Journal of Psychiatry* (Jan.).

When the patient is given this drug, the muscular force of the convulsion induced by the electroshock is reduced so that it can barely be seen, Dr. Robie stated.

After this convulsion, the patient has a period of transient arrest of breathing impulse which is overcome in 30 to 120 seconds by an oxygen resuscitator, Dr. Robie said. Then in five to 10 minutes the patient awakens with no recollection of the treatment.

The drug is given by injection into the veins together with the sleeping medicine sodium pentothal and atropine sulfate. The drug is trade-named Anectine by its manufacturers, Burroughs Wellcome and Co.

It has been used to "soften" electroshock treatment in an "extensive series" of cases at Bellevue Hospital, New York, by Dr. David Impastato. Dr. Robie called it an advance which "marks one of the most significant milestones in psychiatry" and said it assures greater safety to the patient than any previous development since electroconvulsive treatment was discovered.

Science News Letter, January 29, 1955

GENERAL SCIENCE

Only A-Danger Solution Is Avoid War — Russell

➤ THE WORLD has "only one way out" of its present situation and that is "to avoid war," Bertrand Russell, British scientist and philosopher, declared in a statement written for the *Bulletin of the Atomic Scientists* (Jan.).

"I cannot but think that, if the arguments against war are made sufficiently clear," Lord Russell said, "they may through the instrumentality of neutrals, convince the men in the Kremlin and in Peking."

"War cannot be avoided by an obvious and overwhelming preponderance of force on one side," he said. "The two sides are so evenly balanced that each, from patriotic bias, is likely to feel confident of victory. Confidence in victory is, on both sides, absurd. If war breaks out, there will be no victory but only universal defeat.

"The first step toward peace is to have this understood on both sides of the Iron Curtain. At present it seems that powerful men on both sides have failed to appreciate the facts. In the West, even the most powerful men can be influenced by public opinion, and it is the duty of sane men to try to produce a sane public opinion. In Communist countries, it is only governments that count, and it is governments that must be convinced."

Lord Russell said that if it were possible to make both sides simultaneously acknowledge that their ends cannot be achieved by war, a genuine settlement would become possible. But he emphasized that it would have to be a settlement not representing victory for either side.

"Those who think of either communism or anti-communism as a Holy Cause to be pursued in a crusading spirit are out-of-date," he warned. "In a world of nuclear weapons each side must accept the existence of the other, or both sides, equally, must perish."

It is folly to imagine that it would be useful to prohibit the A-bomb and the H-bomb, he declared. No paper prohibition would prevent their employment after war has begun.

Science News Letter, January 29, 1955

AGRICULTURE

New Burley Tobacco Resistant to Wildfire

➤ THE FIRST burley tobacco with a marked resistance to the wildfire disease will be available to growers for 1955 planting, the U. S. Department of Agriculture has announced.

Tagged Burley 21, the new tobacco variety is also resistant to two other destructive diseases of burley tobacco, tobacco mosaic and black root rot.

Developed by the Department's Agricultural Research Service and the Tennessee Agricultural Experiment Station, Burley 21 eliminates the need for using chemical treatments to control wildfire. Immunity to wildfire, a bacterial wilt that is particularly harmful to tobacco leaves, was first transferred to plants of the burley type from a wild tobacco species.

Science News Letter, January 29, 1955

ASTRONOMY

Comet Discovered In Southwestern Sky

➤ A NEW comet has been found in the southwest sky by Guillermo Haro and Enrique Chavira of the Observatorio Astrofisico Nacional, Tonanzintla, Puebla, Mexico, Harvard College Observatory, Cambridge, Mass., reported.

Magnitude of the diffuse object is 16, too faint to be seen without a large telescope. It was originally discovered on Dec. 18, but was not identified as a comet until now. (See SNL, Jan. 8, p. 21.) Since December, it has moved into the constellation of Eridanus, which is visible low in the southwestern sky in the evening.

Science News Letter, January 29, 1955

ENGINEERING

Aluminum Coating May Double Engine Life

➤ AUTOMOBILE ENGINE life may be increased, perhaps even doubled, by aluminum-coating some steel parts.

The coating protects the parts from oxidation and corrosion, four General Motors Corporation engineers told a meeting of the Society of Automotive Engineers in Detroit.

An even coat of the aluminum is achieved with a new process by spraying the metal on the steel part, then heating it in a flux bath until the coating melts.

The technique is particularly well suited to the treating of automobile engine valves which so far has been the major experimental application, Dr. R. F. Thomson, D. K. Hanink, E. B. Etchells and K. B. Valentine said.

In road tests, valves coated with aluminum lasted more than twice as long as uncoated valves made of the same steel.

The use of the Aldip aluminum coating on lift, or poppet, valves was the first application of the process to moving parts of an engine.

It was pointed out, however, that the technique has now progressed beyond the experimental stage and some production installations have been set up.

Success with the poppet valves, the engineers said, points the way to possible application of the principle in turbine engine parts and other high temperature motors where there is a tendency toward oxidation and corrosion.

Science News Letter, January 29, 1955

MEDICINE

Common Mechanism For Cancer-Formers

➤ CHEMICALS THAT cause cancer may all do it by attaching their molecules to protein molecules of the animal and human cells that then become cancerous.

Studies showing that this may be the mechanism which all cancer-causing chemicals have in common were reported by Dr. Charles Heidelberger of the University of Wisconsin, Madison, Wis., at the American Association for the Advancement of Science meeting in Berkeley, Calif.

In his own studies, Dr. Heidelberger worked with the highly active cancer-causing chemical, dibenzanthracene. The chemical was tagged with radioactive carbon in order to observe what happened to it in the animal body.

In studies of similar cancer-causing substances, Dr. Heidelberger found that the degree of cancer-causing activity was closely related to the degree of interaction between the cell protein and the chemicals. Protein-binding has been discovered for two other completely dissimilar types of cancer-causing substances by Drs. J. A. and E. C. Miller of the University of Wisconsin.

Science News Letter, January 29, 1955

GENERAL SCIENCE

Science Aptitude Test

This is a short version of the three-hour examination recently given to more than 16,000 high school seniors throughout the United States in the annual Science Talent Search.

By HOWARD SIMONS

➤ EARLY IN November of last year, Albert Einstein said that if he had it to do all over again, he would be a plumber or a peddler. If you had it to do all over again and would be an Albert Einstein, you can get some idea of your potential for becoming a scientist by taking this test.

The questions represent a short version of the three-hour Science Talent Search examination, distributed by SCIENCE SERVICE, which was given recently to more than 16,000 high school seniors throughout the United States. For these boys and girls, aspiring to become the nation's top research scientists, the test is the first step in a series of hurdles to be overcome in the annual competition for $11,000 in Westinghouse Science Scholarships and a trip to the nation's capital, awarded to each of the 40 winners. (See p. 69.)

If you think the test is tough, you are right. It is designed to be tough. It is deliberately made difficult, so that the results of the examination, together with the individual's report on a science project he has or is completing and an evaluation of his scientific ability and personality by his teachers, make it possible for the judges to spot the 40 top and 260 honorable mention science-minded high school students in the United States each year.

In the past 14 years, 183,943 high school seniors have taken the Science Talent Search science aptitude test. Of this number, only 37,551 have been able to complete all the requirements of the Search.

In addition to the $11,000 awarded each year in Westinghouse Science Scholarships, it is estimated that between 1942, when the first test was given, and 1954, an additional $4,000,000 in scholarships and financial aid has come to the winners and honorable mentions from colleges and universities as a direct result of their Search standing.

Colleges, universities and technical schools have found the Science Talent Search of great significance as a means of spotting above-average science students, and from the first they have used it as a way of dispensing scholarships and other financial aid to students on whom they can rely for exceptional achievement.

At the same time, industry and philanthropic organizations have followed the pace set by the Search, and have instituted or expanded their own programs of scholarship and financial aid.

The job of finding potential science talent in this country becomes more urgent each year. Even with a doubling in the number of scientists, technicians and engineers graduated from American universities and colleges since the end of World War II, the technological age has kept the demand well ahead of the supply. This is more than evident as one reads the want ad columns of newspapers in every city and sees the long columns of job offers for both men and women with scientific educations and backgrounds.

There is still another and presently vital reason why science potential in our high schools must be sought after and found. The Soviet Union has made great progress in the numbers of scientists it has trained. So much so, that Russia's increase in the number of scientists, technicians and engineers is now threatening America's technological superiority.

Inadvertently, the need to train specialists for a specialist's world has developed into a feverish race and the United States can no longer rely on a hit-and-miss attitude. The

DIRECTIONS: Four possible answers are given for each question. Put an X in the parentheses in front of the number corresponding to that answer which you think is **most nearly correct.**

PART A

1. A spiral is the locus of a point revolving around a fixed point or line at an ever increasing distance from the point or line. Which of the following is *not* a spiral?

( ) 1.
( ) 2.
( ) 3.
( ) 4.

2. Capillaries belong to which system?
   ( ) 1. circulatory
   ( ) 2. digestive
   ( ) 3. muscular
   ( ) 4. nervous

3. All of the following are organic except
   ( ) 1. alcohol
   ( ) 2. aldehyde
   ( ) 3. ketone
   ( ) 4. lanthanum

4. An apparatus, invented in 1911, is used to study the behavior of alpha particles, electrons, positrons, mesons, photons, and the collision of these particles with atoms. The apparatus contains moist air, which is permitted to expand rapidly, permitting condensation, and the trails of water droplets reveal the paths of the rapidly moving subatomic particles. This apparatus is a
   ( ) 1. cloud chamber
   ( ) 2. desiccator
   ( ) 3. pressure chamber
   ( ) 4. vaporizer

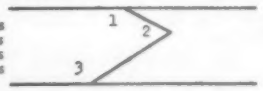
5. Which of the following is *least* related to the other three?
   ( ) 1. altostratus
   ( ) 2. cirrostratus
   ( ) 3. geostratus
   ( ) 4. nimbostratus

8. The chemical elements 101-103, which do not exist today, will, if and when they are made,
   ( ) 1. all be heavy metals
   ( ) 2. conform to the pattern displayed by the elements already known
   ( ) 3. exist in such microscopic quantities that they cannot be identified
   ( ) 4. have to be subjected to experiment before their properties can be described

9. The new field of radio astronomy primarily involves the study of
   ( ) 1. audible sound
   ( ) 2. frequency modulation
   ( ) 3. invisible radiation
   ( ) 4. visible light

10. The death rate from diseases of the heart and blood vessels increases from January through March. Which of the following reasons has the *least* bearing on the situation?
    ( ) 1. Fewer people permit themselves to relax or take vacations in this season.
    ( ) 2. More pneumonia, bronchitis, and other illnesses at this season put more strain on heart and circulation.
    ( ) 3. The shorter day and greater cloudiness permit less exposure to the beneficial rays of the sun.
    ( ) 4. Winter activities call for greater than usual physical exertion, e.g., shovelling snow, pushing stalled cars, stoking the furnace.

11. The sum of the angles 1, 2, and 3 is
    ( ) 1. 180 degrees
    ( ) 2. 240 degrees
    ( ) 3. 360 degrees
    ( ) 4. 420 degrees



12. "They travel fast enough to circle the globe at the equator seven times in a second. They permeate nearly everything. They fill the air, they go through houses, and they can even turn corners and drop down into valleys on the far side of hills. However, they cannot go very far beneath the surface of the ground or penetrate the sea." The word "they" must refer to
    ( ) 1. heat waves
    ( ) 2. infrared waves
    ( ) 3. radio waves
    ( ) 4. sound waves

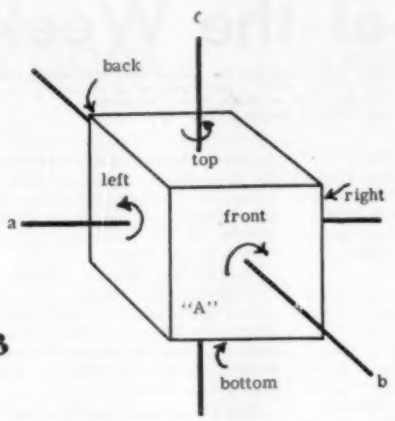
DIRECTIONS: Read each Section carefully. The questions following each Section are based on the information given. In other words, the answers to the questions are dependent in some way on the materials of the Section to which they belong. Four possible answers are given for each question. Put an "X" in the parentheses in front of the number corresponding to that answer which you think is most nearly correct.

SECTION N

A cube may be rotated about any one of its three axes, a, b, or c. The rotation of the cube 90° about "a" in the direction of the arrow may be denoted by a; the rotation of the cube 90° about "b" in the direction of the arrow by b; and the rotation of the cube 90° about "c" in the direction of the arrow by c.

If operation a is performed twice, the whole operation may be indicated as a^2; if three times, as a^3; etc. Similarly, the same holds for b and c. If operation b is performed, and then c, the result is bc.

QUESTIONS ON SECTION N



PART B

96. After the operation a^2b, where is face "A"?

( ) 1. back
( ) 2. bottom
( ) 3. left
( ) 4. top

97. Where was the face which is on the bottom after the operation bc before the operation?

( ) 1. back
( ) 2. left
( ) 3. right
( ) 4. top

98. Which operation leaves the cube in the same position as it is after $a^2b^2c^2$?

( ) 1. $(bc)^2$
( ) 2. b^2c^2
( ) 3. c^4
( ) 4. c^2ba^2

105. Match the following by putting the number of the symbol in Column II in the parentheses in front of the corresponding expression in Column I.

COLUMN I		COLUMN II
( ) A.	$\sqrt{-1}$	1. ¢
( ) B.	2.71828	2. ℮
( ) C.	battery	3. ⅈ
( ) D.	electrical condenser	4. ∞
( ) E.	infinity	5. ♂
( ) F.	integral	6. ∫
( ) G.	is greater than	7. ⊣⊢
( ) H.	male	8. ♀
( ) I.	resistor	9. ⌇⌇⌇
( ) J.	speed of light	10. ∝
		11. >
		12. Σ
		13. ⊣⊢
		14. <
		15. ∂

PART C

102. Mark the largest celestial body 1, the second largest 2, etc., in the order of decreasing size (largest to smallest):

_____A. Earth

_____B. Jupiter

_____C. Mars

_____D. Moon

_____E. Neptune

SCIENCE QUIZ — These questions are part of the three-hour Science Talent Search examination. Try them and then compare your results with those of a random sampling of more than 16,000 high school seniors throughout the United States who took the full length test.

---

threat of losing the scientific and technological race educating those teen-agers with the ability and interest in a science career looms larger and larger. Effective means for searching out these potential research scientists and aiding them must be applied, if we are to keep ahead of the Soviet Union's vast training program.

The Science Talent Search represents a scientific method of seeking out each year those high school seniors with the greatest aptitude for careers in scientific research. But it does more. In high school after high school, records show that the very existence of the test and the interest manifested in it, serve as spurs impelling many students toward a study of the sciences.

Ready to test yourself? There are three parts to the short version. You should be able to do the selected parts of the test in a half-hour. Time yourself so that you do not go over 30 minutes and answer all the questions as best you can in one session.

Try the test first, score yourself and then compare your results with those of 177 of the high school seniors who answered the same 15 questions during the three-hour examination. Use the answers shown on p. 77.

These 177 students' answers were selected at random by the graders from the 2,575 tests corrected. This was the number of Search participants that were able to complete all requirements for the competition this year.

Because questions 102 and 105 have multiple answers, a perfect score would be 28 for the 15 questions. If you find that you have answered all the questions of the short version correctly, then you have done better than any of the 177 students. None of them answered all the 15 questions correctly, nor made a perfect score on the full test. No student has ever made a perfect score, nor is anyone likely to do so.

A high score on the sample test would be 22 or better. Of the 177 sampled papers, 35 students scored this well or better. A low score would be 9 or less. Only 15 of the 177 high school seniors fell into this scoring bracket.

Based on the results of the 177 random samples, the easiest questions were numbers 1, 2, 5, 102D, 105A and 105G. Each of these was answered correctly by more than 150 of the 177 students. Questions 8, 105B, 105F and 105J were the hardest, with less than 80 students being able to answer them correctly.

The very hardest questions of the 15 turned out to be Nos. 8 and 105B which were answered correctly by only 58 of the 177 teen-agers.

When you have compared your results with those of the youngsters, and if you find you have a poor mark, this does not necessarily mean that you are not bright. The examination is not an intelligence test. It is, explain the psychologists responsible for devising it each year, an aptitude test, designed to find those students with the greatest interest and aptitude for becoming a research scientist.

The 40 high school seniors who come out on top will be in Washington from Feb. 24 through Feb. 28 for the Fourteenth Annual Science Talent Institute. They will meet and talk with leading scientists, visit some of the extensive government research laboratories, hear scientific lectures, and attend a final banquet when the winners of the $11,000 in scholarships will be announced.

The scholarships can be used at any accredited college or university.

The 40 winners are chosen by Dr. Harold A. Edgerton, New York psychologist; Dr. Steuart Henderson Britt, Chicago psychologist; and Dr. Rex A. Buxton, Washington psychiatrist.

To see the complete aptitude test, send ten cents in coin to SCIENCE SERVICE, 1719 N Street N.W., Washington 6, D. C. Ask for the science aptitude test.

• Books of the Week •

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

ADVANCES IN VIRUS RESEARCH: Volume II—Kenneth M. Smith and Max A. Lauffer, Eds.—*Academic*, 313 p., illus., $7.00. Bringing together critical review articles, written from various points of view, on representative viruses causing diseases of man, animals, plants and bacteria.

ARCHEOLOGICAL INVESTIGATIONS IN THE OAHE DAM AREA, SOUTH DAKOTA, 1950-51: Inter-Agency Archeological Salvage Program—Donald J. Lehmer—*Govt. Printing Office*, Smithsonian Institution, Bureau of American Ethnology, Bulletin 158, 190 p., illus., paper, $1.50. The first detailed, technical report covering a completed series of excavations carried on by the Missouri Basin Project of the River Basin Surveys of the Smithsonian.

ASPECTS OF DEEP SEA BIOLOGY—N. B. Marshall—*Philosophical Library*, 380 p., illus., $10.00. After tracing the growth of deep sea biology, a relatively new science, the author attempts to build up an integrated account of ocean life. Beautifully illustrated.

COMPREHENSIVE DENTAL CARE IN A GROUP PRACTICE: A Study of Service and Time Requirements—*Govt. Printing Office*, Public Health Service Publication No. 395, 48 p., paper, 25 cents. A study of the dental care given under the auspices of the Group Health Association, Inc.

CONSERVING NATURAL RESOURCES: Principles and Practice in a Democracy—Shirley W. Allen—*McGraw-Hill*, 347 p., illus., $5.50. Analyzing the practices that lead to the depletion of our natural resources and those that foster their fair distribution and conservation.

CRYPTOGAMIC BOTANY—Gilbert M. Smith—*McGraw-Hill*, 2d ed., Vol. I, Algae and Fungi, 546 p., illus., $8.50, Vol. II, Bryophytes and Pteridophytes, 399 p., illus., $8.00. Descriptions of many of the representative genera have been revised in the light of new knowledge, and representatives with a wider geographical distribution have been substituted.

EXCAVATIONS AT STAR CARR: An Early Mesolithic Site at Seamer near Scarborough, Yorkshire—J. G. D. Clark and others—*Cambridge University Press*, 200 p., illus., $11.50. The discoveries at Star Carr illustrate the importance of excavating sites capable of throwing light on animal and plant life and the use man made of them.

EXPERIMENTAL STUDIES IN EQUINE INFECTIOUS ANEMIA—Miklos N. Dreguss and Louise S. Lombard—*University of Pennsylvania Press*, 203 p., illus., $6.50. Based on work done at the School of Veterinary Medicine, University of Pennsylvania, as well as an attempt to bring together all the pertinent information on this subject in one volume.

GEOLOGY AND MINERAL DEPOSITS OF BARSTOW QUADRANGLE SAN BERNARDINO COUNTY, CALIFORNIA and THERMAL PROPERTIES OF CERAMIC MATERIALS FROM BARSTOW QUADRANGLE, CALIFORNIA—Oliver E. Bowen Jr. and Joseph A. Pask—*California Division of Mines*, Bulletin 165, 208 p., illus., $3.00.

THE IMPACT OF COMPUTERS ON OFFICE MANAGEMENT: Experience in Computer Application—W. W. Smith and others—*American Management Association*, Office Management Series No. 136, 60 p., illus., paper, $1.75. Written by representatives of companies pioneering in large-scale computer application, and including a discussion of the expected effects of office mechanization on the office worker.

INTELLIGENT LAYMAN'S MEDICAL DICTIONARY—Harry Swartz—*Ungar*, 306 p., illus., $4.75. Written by a physician especially for laymen, this dictionary gives explanations of key terms in various branches of medicine.

AN INTRODUCTION TO ETRUSCAN ART—P. J. Riis—*Philosophical Library*, 144 p., 82 plates, $10.00. Originally written as one of a series of Danish booklets to interest the layman in the work and results of the modern archaeologist.

JET: The Story of a Pioneer—Sir Frank Whittle—*Philosophical Library*, 320 p., illus., $6.00. This book is primarily the history of the author's association with the development of the turbo-jet engine in Great Britain.

JOURNAL OF CHRONIC DISEASES: Volume 1, Number 1—Joseph Earle Moore, Ed.—*Mosby*, 110 p., paper, $12.50 a year. Published monthly, this journal is devoted to the problems of chronic illness of all age groups.

NATIONAL SCIENCE FOUNDATION FOURTH ANNUAL REPORT FOR THE FISCAL YEAR ENDING JUNE 30, 1954—Alan T. Waterman, Director—*Govt. Printing Office*, 138 p., illus., paper, 50 cents. Telling of the advances in science of the past year, the scientific manpower situation, as well as the many other activities of the National Science Foundation in support of scientific research.

OLCOTT'S FIELD BOOK OF THE SKIES—Revised by R. Newton Mayall and Margaret W. Mayall—*Putnam*, 4th ed., 482 p., illus., $5.00. In this new edition the text has been simplified, and charts and drawings have been corrected to conform with the latest available information.

ORGANIC CHEMISTRY—Lewis F. Hatch—*McGraw-Hill*, 324 p., illus., $4.50. A text for a one-semester course written primarily for those whose particular field of interest requires an understanding of organic chemistry.

RADIOISOTOPE CONFERENCE, 1954: Proceedings of the Second Conference, Oxford, 19-23 July—J. E. Johnston, R. A. Faires and R. J. Millett, Eds.—*Academic*, Vol. I, Medical and Physiological Applications, 418 p., illus., $10.80, Vol. II, Physical Sciences and Industrial Applications, 223 p., illus., $7.50, both volumes $16.00. Sponsored by the Atomic Energy Research Establishment, Harwell.

SYMPOSIUM ON HUMAN FACTORS IN EQUIPMENT DESIGN—W. F. Floyd and A. T. Welford, Eds.—*H. K. Lewis (John de Graff)*, 132 p., illus., $4.00. The result of a symposium held by the Ergonomics Research Society at which the various aspects of the problem of equipment design, especially as they relate to industry, were discussed.

SYMPOSIUM ON FATIGUE—W. F. Floyd and A. T. Welford, Eds.—*H. K. Lewis (John de Graff)*, 196 p., illus., $4.00. Papers originally given at a symposium on fatigue held by the Ergonomics Research Society in March, 1952.

UNDERWATER PHOTOGRAPHY AND TELEVISION: A Handbook of Equipment and Techniques—E. R. Cross, with foreword by Roger Revelle and a chapter on Deep-Sea Photography by Robert S. Dietz—*Exposition Press*, 258 p., illus., $6.00. The author is a master diver and director of the Sparling School of Deep-Sea Diving in Wilmington, Calif., where he has taught underwater photography for six years.

Science News Letter, January 29, 1955

MEDICINE

Find Chemicals That Cause Arthritis in Rats

➤ CHEMICALS THAT produce degenerative arthritis, bone and joint changes and damage to the aorta, chief artery of the body, have been discovered by scientists at the State University of Iowa.

The chemicals produce these bone, joint and artery changes in rats. They probably do not cause the arthritic and other damage in humans unless they get loose in human bodies from some fault in body chemistry. But the changes the chemicals cause in rats are so exactly like those seen in human patients that the scientists feel they are perhaps on the track of finding a chemical basis for arthritis and the artery condition, dissecting aneurysm of the aorta.

At least there now exists a way of producing the conditions in the laboratory and from this it may be possible to find a way of reversing or preventing the chemically induced changes. In that case, the remedy for the rat ailment might prove useful to humans.

The chemicals which cause the arthritic and other damage are aminonitriles. Discovery of their role in rat arthritis is announced by Drs. S. Wawzonek, I. V. Ponseti, R. S. Shepard and L. G. Wiedenmann, of the departments of chemistry and orthopedics in *Science* (Jan. 14).

Science News Letter, January 29, 1955

Swimming's more fun

Protect your eyes and nose—see where you're going—and explore the underwater wonder world with this imported Mediterranean swim mask! Softest, strongest rubber seals 100% watertight to face. Extra wide, clear vision. Only 3.95. ☐

NEW Skin Divers' complete catalogue of books, imported & U. S. snorkels, guns, Aqua-lungs, fins, knives, and other diving gear. 25c ☐ Check your order and enclose cash ☐ check ☐ money order ☐ (all ppd.) or COD ☐ Send to Aquafun, Davenport 2, Iowa, Today!

with AQUAFUN!

Cargille's

Immersion Oil for Microscopy is **Non-Drying**

Also, other advantages

Write for leaflet IM-SNL

R. P. CARGILLE LABORATORIES, Inc.

117 Liberty Street, New York 6, N. Y.

HORTICULTURE

All-America Selections

▶ THREE NEW flowers and three new varieties of vegatables will have the title, "1955 All-America Selections," as a result of the annual competition for the world's leading new introductions of flowers and vegetable seeds.

Awarded bronze and silver medals as the outstanding new varieties that will be available for planting in American homes and gardens during 1955, the winners include a cockscomb, columbine, petunia, sweetcorn, muskmelon and snapbean.

One of the 1955 flower winners, McKana's Giant columbine, is the first perennial to win such an award in the last 18 years. The McKana Giant is described as introducing "taller, more bushy and stronger plants to support larger, extra long-spurred flowers."

The new columbine, awarded a bronze medal, comes in a wide range of clearer and richer blue, primrose, deep yellow, pink, red, purple, white, maroon and complementary combinations of these colors.

Toreador celosia, another bronze medal winner, is a huge crimson-red cockscomb. In this variety, it is reported, the foliage is lighter and brighter green and the heavy stems are flushed rose-pink. Toreador grows about two feet tall towards the end of the summer, and has a distinguishing feature in that the entire strength of the plant seems to go into the development of one colossal cockscomb.

The third flower winner, which also rereived a bronze medal, is the Prima Donna petunia, the rose-pink counterpart of Ballerina, the 1952 winning salmon-pink petunia. Prima Donna, a first generation hybrid, grows 12 to 15 inches tall and is almost solid in coloring. It is a giant fringed grandiflora type of petunia.

In the vegetable class, Golden Beauty sweetcorn and Pennsweet muskmelon were picked as regional "All-America Selections," while Seminole bush snapbean was chosen with the general recommendation that it can be raised wherever beans are grown.

Golden Beauty sweetcorn received a silver medal. It was developed by William H. Lachman, olericulturist at the University of Massachusetts, Amherst, Mass., and is best suited for such short growing season areas as the northern states, Canada and winter crops in south Florida.

Awarded a bronze medal, Pennsweet muskmelon was also bred for northern, short-season climates. It is described as a good producer of softball size fruits, with very thick and flavorable flesh. The seed cavity is especially small.

Seminole, winner of a silver medal, is the new disease-resistant, deep apple-green, round-podded bush snapbean. It was developed at the Everglades Experiment Station of the University of Florida. The plant is described as producing stringless pods, which are meaty, and which have a low fiber content.

The snapbean was chosen the best of the garden varieties entered in the competition.

The selections are made by "All America Selections," an independent, non-profit organization, with headquarters in Harrisburg, Pa., which is financed largely by the seed industry itself.

The organization tests new varieties sent to it in trial gardens all over the nation. After two years of testing, judges pick the outstanding new plants and award them either gold, silver or bronze medals.

Dozens of prospective new varieties from around the world are grown and tested each year along with varieties already being marketed for comparison.

Science News Letter, January 29, 1955

SCIENCE QUIZ ANSWERS

Now that you have taken the science aptitude test, you are ready to check your answers. Give yourself one point for each right answer.

Correct answers to Part A are: 1-3; 2-1; 3-4; 4-1; 5-3; 8-2; 9-3; 10-3; 11-3; 12-3.

Correct answers to Part B are: 96-3; 97-3; 98-3.

Correct answers to Part C are: 102A-3; 102B-1; 102C-4; 102D-5; 102E-2; 105A-3; 105B-2; 105C-13; 105D-7; 105E-4; 105F-6; 105G-11; 105H-5; 105I-9; 105J-1.

Science News Letter, January 29, 1955

VETERINARY MEDICINE

Earthworm May Be Link In Swine Disease Cycle

▶ THE EARTHWORM may be the secret hiding place of the kidney worm, a swine parasite that costs American livestock men an estimated loss of $72,772,000 a year.

Scientists, long puzzled over the whereabouts of the kidney worm during its early stages spent in the soil, have now successfully infected pigs in the laboratory with the disease by feeding them earthworms infected with the parasite's larvae.

If similar findings result from tests made under actual field conditions, researchers will have found the answer to the "missing link" in the kidney worm's life cycle. The possibility that the host is the earthworm is being explored by Dr. Francis G. Tromba, a parasitologist at the U. S. Department of Agriculture's experiment station, Beltsville, Md.

Pigs pick up the kidney worms by swallowing larvae or simply by lying down on contaminated ground. During dry spells or cold weather the larvae do not stand much of a chance for survival in the soil, but they could find favorable conditions by being picked up by earthworms.

At present, there is no known medicinal cure or treatment for the kidney worms which attack the liver, loin muscles and, on occasion, the blood vessels, kidneys and lungs of swine. This damage results in the need to trim expensive parts of the meat.

It is also reported in *Agricultural Research* (Jan.) that there is no known cure or treatment for the removal of several other swine parasites also being studied at the Beltsville station, which together with the kidney worm cause damage estimated at $200,000,000 a year.

Science News Letter, January 29, 1955

New and Different

Optical Radioactivity Detector!

GEIGERSCOPE

PROFESSIONAL MODEL

$5 POSTPAID

Designed for the research chemist, physicist, plant and safety engineer, educator and industrialist. Now in use in hundreds of laboratories in industry, atomic energy plants and major universities. More sensitive for use on radioactive samples or mineral specimens than any portable electronic instrument, regardless of price. Sturdy, durable, portable as a pocket watch. Requires no power source because it converts the energy of alpha rays directly into visible signals. Has no background count from potassium feldspar or cosmic rays. 30 power magnification. Will readily detect and measure any alpha-active isotope down to the range of a millionth of a microcurie. Detects contamination of air, surfaces, hands, apparatus not revealed by conventional instruments. Extends your measurement range. Invaluable for anyone interested in radioactivity. Supplied complete with calibrated radium standard, uranium ore sample, direction sheet and air-tight holster. Sold by mail only. UNCONDITIONAL WRITTEN GUARANTEE. Send check or money order to

KEN RESEARCH SALES 681 MAIN STREET, HACKENSACK 3, N. J.

ENTOMOLOGY

Fool Female Screwworm

➤ THE SCREWWORM fly may be eradicated from Florida and controlled in Texas, where its maggots cause millions of dollars loss to livestock men each year, by fooling the females with sterile males as was recently accomplished on Curacao island in the West Indies.

Eradication of the cattle pest in Florida could cost less than the monetary loss caused by the insect in southeastern Florida for a single year, Dr. A. W. Lindquist, head of the U. S. Department of Agriculture's section of insects affecting man and animals, reported to the Entomological Society of America meeting at Tampa, Fla.

Dr. Lindquist's report on the possible eradication of the screwworm in the United States followed an announcement by the Department that scientists had successfully eradicated the insect from the Caribbean island of Curacao by sterilizing the males with atomic radiation and releasing them on the natural population. Female screwworm flies mate only once.

"At this time," Dr. Lindquist stated, "the obstacles are not insurmountable and given time and funds, this second phase of using sterile screwworms on a natural population should be successful."

Heretofore, large-scale application of this atomic-age insect control was not thought possible. The problem of reinfestation from other areas, as well as the herculean task of rearing, sterilizing and releasing the flies brought about the trial test on Curacao, which is a small, isolated island 50 miles from the nearest land.

Now, the government scientist pointed out, studies have shown that winter temperatures that are below average drive the screwworm into the southern two-thirds of Florida and this would be the opportune time to attempt a test eradication program on a larger scale than in Curacao.

The area affected during this winter freeze-back of the insects is approximately 50,000 square miles, or 300 times the size of the Dutch island. Dr. Lindquist suggested that an initial test on an area of 2,000 square miles in Florida would be practical after two more years that are needed to perfect presently used eradication methods.

He explained that researchers need a year or two more to study better methods of estimating the natural fly population and an improved and cheaper means of raising the sterile flies.

Eradication in Texas is held all but impossible as the flies can reinfest the area from Mexico. However, Dr. Lindquist stated that the sterile screwworm program might be utilized in Texas as a control measure to prevent further spread of the pest.

Science News Letter, January 29, 1955

PHYSICS

Russians Stick to Red Line

➤ THE RUSSIANS stick to their red line, even as the standard for the international meter.

At the International Conference on Weights and Measures held in Paris, Russian scientists stood firmly for basing the international meter on the red line of cadmium.

Scientists in the United States believe the Russians back this particular red line not only because of its color, but because of its historical significance. The red cadmium line was used by the late Albert Michelson in the 1880's in experiments measuring the speed of light.

Other lines being considered as the standard are krypton 84, xenon 136 and mercury 198. United States scientists back use of mercury 198 because of its simplicity.

All that is needed is a little tube filled with mercury 198, obtained in pure form by bombardment of gold in an atomic pile. The green mercury line glows when the tube is hit with waves of radio frequency.

Delegates to the conference deferred final judgment on which line to use for the international meter until their next meeting in 1960. In the meantime, physicists in each country will study the advantages and disadvantages of the four proposed lines, reporting their findings on the best method to the 1960 conference, which will also be held in Paris.

The ideal standard for the international meter would be one that is indestructible and would give exactly the same length for the meter at any laboratory in the world with the proper equipment. The apparatus needed for its determination should not be too bulky, expensive or hard to handle.

With it, any laboratory with the proper equipment could have a basic standard on the premises.

The present international meter, set up in 1875, is the distance between two scratches marked on a bar of platinum-iridium alloy kept in an air-conditioned vault at the International Bureau of Weights and Measures, Sevres, France. It was so constructed that at zero degrees Centigrade, which is 32 degrees Fahrenheit, its length is one ten-millionth of the earth's meridian quadrant at sea level.

The legal standard of length of the United States, maintained by the National Bureau of Standards, was directly compared to the international standard meter.

Mercury 198 is so called because it is an isotope of mercury having an atomic weight of 198. Ordinary mercury such as found in household thermometers has an atomic weight of 200.61.

Measurements based on the mercury 198 green light wave, which is 21-millionths of an inch long, will make possible length determinations precise to one part in 100,000,000.

One advantage of mercury 198 over cadmium is that it emits a more nearly perfect monochromatic light. This means that the red, green or other color used is a single wavelength rather than multiple wavelengths extremely close together.

Other advantages of mercury are that it does not need special heating equipment, and that the human eye is seven times more sensitive to green light than to red.

Xenon and krypton, two gases also being considered as the internationtal standard, have the advantage that wavelength readings can be taken at very low temperatures. This considerably cuts down "line broadening," which makes accurate readings difficult.

Science News Letter, January 29, 1955

• RADIO

Saturday, Feb. 5, 1955, 5:00-5:15 p.m. EST

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. William Rieman III, professor of analytical chemistry at Rutgers, the State University of New Jersey, New Brunswick, N. J., will discuss "One Ion For Another," a discussion of new methods of chemical analysis, ion exchange and chromatography.

YOUR HAIR

Its Health, Beauty and Growth

By Herman Goodman, M.D.

A medical specialist tells you what to do to save and beautify your hair, stimulate healthier hair growth, and deal with many problems, as: Dandruff—gray hair—thinning hair—care of the scalp—baldness — abnormal types of hair — excessive oiliness—brittle dryness—hair falling out—infection — parasites — hair hygiene — glands—diet—coloring—and myriad other subjects concerning hair.

"Discusses the many problems of hair retention, regrowth and removal."—Science News Letter.

287 pages—PROFUSELY ILLUSTRATED!

Price $2.95, Postfree. 5-day Money-Back Guarantee

EMERSON BOOKS, Inc., Dept. 311-K

251 W. 19th Street, New York 11

Educational Electric Motor

Quantity Prices for Schools

Real Electric Motor in kit form. All parts except battery. Fun to build, fun to run. Build in 15 minutes without tools. Over 1,000,000 sold for home & classroom use. Practical & simple way to learn principles of electricity, magnetism, how motor operates, and how electricity is generated. 6000 r.p.m. Every part precision made for easy assembly. Die-cut baseboard. Runs on No. 6 dry cell or transformer. (Not furnished.) Schools, clubs, camps, Army & Navy programs use them.

Each 35¢. 10 or more, 28¢ ea. 100 or more, 25¢ ea.

World of Adventure, Dept. 135, Ann Arbor, Mich.

New Science Adventure Catalog

Make your life more fun, more profitable, more interesting. Packed with over 1,200 items; science materials, hobbies, travel aids, life and vocational guidance, aptitude tests, wall-charts, unusual maps, consumer and health guides, languages, slides, records, nature specimens, low priced paper-back books on everything from art to zoology, etc., etc. Catalog 10¢.

World of Adventure, Dept. 135, Ann Arbor, Mich.

ICHTHYOLOGY

NATURE RAMBLINGS

Hitch-Hikers

➤ BACK IN that almost forgotten age when there were no automobiles the reigning generation practiced the sport of "hooking rides" on horse-drawn wagons. This was greatly frowned upon by their fathers, who themselves went to great lengths to get that cherished talisman, a railroad pass.

Hitch-hikers are still with us, and if the free pass is a thing of yesteryear on the railroads of the nation, there are still those who ride empty box-cars or the rattling rods from place to place.

This system of getting from here to there by letting some other fellow take you along was invented long ago, probably long before man appeared on the earth at all, by a fish. This is the remora, hitch-hiker of the oceans, known to seafaring men the world over as the "pilot-fish" or "shark-sucker."

A strange creature of tropic waters, the remora catches rides on sharks and other large fish, on turtles and sometimes even on boats, by attaching itself to them with a powerful sucking-disk apparatus which covers the whole top of its head.

The sucking mechanism is an odd development of the remora's dorsal fin, which starts like the dorsal fins of most other fish but rapidly changes into a powerful series of suction cups. Shaped somewhat like the sole of a shoe, the adhesive organ is divided into many compartments.

With it, the flat-topped fish attaches itself to the belly of a shark or the bony stomach plates of a sea turtle, and is there to stay. No amount of twisting or turning or scraping against the bottom will serve to dislodge the hitch-hiker.

The shark or turtle may take its passenger in bad grace, but there is nothing to do but grin and bear it. Aside from stealing transportation, the remora is not a parasite. It does not feed upon its host, as does the dreaded sea lamprey. Instead, it rides along until the larger fish finds a meal.

Then the pilot-fish lets go and joins wholeheartedly in the feast. When the food is gone, back goes the suction. These are the two main goals in the remora's limited ambitions: free rides and free lunches.

Even so lazy a creature is often put to work by man. Fishermen can be lazy too. For thousands of years primitive fishermen in the West Indies, in Malaya, China, Australia and Polynesia, have used the remora as a sort of self-propelled, self-directing fish hook. They tie a cord to the pilot-fish's tail, and release it where there may be turtles. Away goes the remora.

If a turtle is available, the remora attaches itself to it, the fishermen haul in on their line, and in comes remora, turtle and all.

Science News Letter, January 29, 1955

GENERAL SCIENCE

University Offers Course in Interlingua

➤ NINE UNITED States scientific publications are now using the new international language, Interlingua, and a university is offering a course in it.

This news of the language being introduced by SCIENCE SERVICE was made public in New York when Dr. Charles D. Marple, medical director of the American Heart Association, announced that *Circulation*, beginning with the January issue, will become the ninth U. S. scientific journal to use Interlingua.

These nine use the new language for summarizing articles appearing in them. One other, SCIENCE SERVICE's monthly SCIENTIA INTERNATIONAL, is published in Interlingua exclusively.

Interlingua is a language composed of elements common to Spanish, Portuguese, French, Italian and other Romance languages. Its existence and value were first made known to many in the scientific and health fields at the time of the Second World Congress of Cardiology held in Washington in September, 1954. Abstracts of papers presented at the Congress were published in the program in the new language.

The increasing popularity of the language has resulted in the inclusion of an Interlingua course in the adult education curriculum of New York University. The course will start in February and will be taught by Dr. Alexander Gode, chief of the Interlingua Division of SCIENCE SERVICE and the leading authority on the language.

Science News Letter, January 29, 1955

PSYCHOLOGY

Commercials Recalled Better If Spoken Slowly

➤ WHEN A radio or television announcer gives his commercial, he should speak more slowly than he would in reading a news dispatch or than an actor would in a dramatic sketch.

This was reported to the American Association for the Advancement of Science meeting in Berkeley, Calif., by Dr. Norman Young, psychologist of Brooklyn College, New York.

When the commercial comes on, the television or radio audience seizes the opportunity to relax the attention. That is the moment for exchanging a quick word with the family, or to go to the refrigerator for a snack, Dr. Young told his colleagues.

Under such relaxed-attention circumstances, a message spoken at 145 words per minute has a better chance of being remembered than one given at 185 words per minute, he found from experiments.

Science News Letter, January 29, 1955

Questions

ENTOMOLOGY—What method was proposed to fight the screwworm in Florida and Texas? p. 78.

□ □ □

GENERAL SCIENCE—How much does the new budget propose the government spend on scientific projects? p. 68.

□ □ □

MEDICINE—How are doctors planning to test the cancer forming power of tobacco tars? p. 68.

□ □ □

PHYSIOLOGY—About how long does it take to rise 100 feet underwater? p. 72.

□ □ □

RADIO ASTRONOMY—What is the significance of the absorption lines found in radio waves from space? p. 71.

□ □ □

Photographs: Cover, U. S. Navy; p. 66, CBS Laboratories; p. 67, Selas Corporation of America; p. 71, New York University; p. 80, Eastman Chemical Products, Inc.

Interested in URANIUM?

Send for this

ATOMIC PROSPECTOR'S HANDBOOK

Offers valuable data and concise descriptions of all commercially important radioactive minerals, field, laboratory and mill methods, equipment, tests, reference tables, maps, summary of Atomic Energy Commission Regulations, in 54 information-packed pages. Everything you need to know about this vital, new field! $1 Postpaid. Money back if not satisfied. Send cash, check or money order to

KEN RESEARCH SALES

681 Main St. Hackensack 3, N. J.

AT YOUR FINGERTIPS —

More than 800 Element Facts

The Elemental Slyd-Rul now completely up to date. Symbol, weight, density, number, valences, color, M & BP in °C for 98 elements plus recent name changes. In tough-check cardboard stock. $1, postpaid. Student rate: 12 or more, 75c ea.

The Slyd-Rul Co., Canaan, N. Y.

• New Machines and Gadgets •

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 763. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

⚙ *HUNTER'S QUIVER for bowmen provides quick arrow removal. Unlike conventional quivers, arrow points are housed in leather pockets and shafts in an open framework of aluminum. Weighing only eight ounces, any arrow is grasped by the nock and swung over the shoulder in an arc, ready for action.*

Science News Letter, January 29, 1955

⚙ *OVEN THERMOMETER is made to stand on oven shelves or be hung from oven racks, close to the baking dish or roasting pan. Its dial-type face can be read in the darkest of ovens and the bi-metallic temperature element has a range of 200 to 500 degrees Fahrenheit.*

Science News Letter, January 29, 1955

⚙ *PLASTIC-HULLED BOAT is described as leakproof and capable of being stored outdoors in all kinds of weather. The craft's plastic hull, made of a resilient reinforced glass fiber, permits year-round use without fear of drying out, rot or corrosion. The boat is available in three models for the outboard motor boat enthusiast. Distribution is scheduled for early 1955.*

Science News Letter, January 29, 1955

⚙ *LIGHTWEIGHT HOBBY horse for young roughriders, shown in the photograph, is made of chip-proof plastic. Weighing approximately five pounds, and measuring nearly two and one-half feet high and over three feet long, the horse is spring suspended in a wooden frame to give realistic galloping action.*

Science News Letter, January 29, 1955

⚙ *WATER SYSTEM is a single compact electrical unit that provides both hot and cold running water under pressure for small homes, resort cottages, filling stations and trailers. The unit consists of a one-third h.p. capacitor motor, four-gallon pressure tank for cold water and a 12-gallon hot water heater with adjustable thermostat.*

Science News Letter, January 29, 1955

⚙ *WHITE INK set provides an industrial marking liquid that adheres to rubber, cellophane, wood, aluminum foil, glass, and many other surfaces. Set also contains solvent which easily removes ink, as well as a felt-nib fountain pen which is filled by a squeeze of the bulb at one end.*

Science News Letter, January 29, 1955

⚙ *FILTER CASE protects photographic filters from dust and, at the same time, keeps them visible for quick selection. The combination top and holder, made of plastic, holds six filters and has a molded loop for attachment to a camera strap. Inner holder is easily removed for getting a desired filter.*

Science News Letter, January 29, 1955

⚙ *NEW FASTENER holds slip-covers, top sheets or blankets in place. Resembling a plastic foot ruler, the device has 11 points, one of which is a locking pin. The points are secured to the slip-cover and sofa, and the locking pin holds them fast, preventing creeping.*

Science News Letter, January 29, 1955

SCIENCE SERVICE FILMSTRIPS

Authentic • Timely • Instructive

Ten titles — each strip complete with lecture notes.
37 to 67 single picture frames on 35 mm. safety film.

1. Antibiotics
2. Blood, The Stream of Life
3. Controlling Insect Pests
4. Fundamentals of Electricity
5. Knots and Ropes
6. Use & Care of Woodworking Tools
7. Working with Metal
8. How to Solder
9. Plastics
10. Youthful Scientists

Packed in individual metal cans

ORDER TODAY

Please send me the following Science Service Filmstrips for which I enclose $1.25 each; (Circle numbered titles desired).

1	2	3	4	5
6	7	8	9	10

1-29-5

← Mail to my address as imprinted at the left.

Do You Know?

An *ostrich* does not bury its head when confronted with danger, but kicks viciously when cornered or wounded.

Most of the 6,600,000 long tons of *sulfur* produced in the United States in 1954 came from 13 salt dome deposits in Louisiana and Texas.

If diagnosis is made early, approximately half the cases of *lung cancer* would have a 50% chance of surviving five years after operation.

Tobacco mosaic virus particles, so tiny that they can only be seen under an electron microscope, have been broken apart by *ultrasonic vibrations* of 7,000,000 cycles a second.

Bass have been found to feed more actively when water is about 72 degrees Fahrenheit; when water temperature rose to 82 degrees, few of the large bass would take food.